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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,946	06/01/2001	David L. Cooper	27716.010500	9475
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GREENBERG-TRAURIG 1750 TYSONS BOULEVARD, 12TH FLOOR MCLEAN, VA 22102				
			EXAMINER	
			STARKS, WILBERT L	
			ART UNIT	PAPER NUMBER
			2121	



DATE MAILED: 09/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

COOP	GREENBERG TRAURIG DOCKETED		
Entered	10/4/04	Ref. #	27716.010500
Action Due	Non-Final Response due 12/29/04		
Action Due	Final Deadline 3/29/05		
Action Due			

Office Action Summary

Application No.

09/870,946

Applicant(s)

COOPER, DAVID L

Examiner

Wilbert L. Starks, Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-90 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-90 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-946) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. §101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

the invention as disclosed in claims 1-90 is directed to non-statutory subject matter.

2. Regardless of whether any of the claims are in the technological arts, none of them is limited to practical applications in the technological arts. Examiner finds that *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994) controls the 35 USC §101 issues on that point for reasons made clear by the Federal Circuit in *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447 (Fed. Cir. 1999). Specifically, the Federal Circuit held that the act of:

...[T]aking several abstract ideas and manipulating them together adds nothing to the basic equation. *AT&T v. Excel* at 1453 quoting *In re Warmerdam*, 33 F.3d 1354, 1360 (Fed. Cir. 1994).

Examiner finds that Applicant's "computational node" and "processing layer" references are just such abstract ideas.

3. Examiner bases his position upon guidance provided by the Federal Circuit in *In re Warmerdam*, as interpreted by *AT&T v. Excel*. This set of precedents is within the

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same line of cases as the *Alappat-State Street Bank* decisions and is in complete agreement with those decisions. *Warmerdam* is consistent with *State Street's* holding that:

Today we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation because it produces "a useful, concrete and tangible result" – a final share price momentarily fixed for recording purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. (emphasis added) *State Street Bank* at 1601.

4. True enough, that case later eliminated the "business method exception" in order to show that business methods were not per se nonstatutory, but the court clearly *did not* go so far as to make business methods *per se* statutory. A plain reading of the excerpt above shows that the Court was *very specific* in its definition of the new *practical application*. It would have been much easier for the court to say that "business methods were per se statutory" than it was to define the practical application in the case as "...the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price..."

5. The court was being very specific.

6. Additionally, the court was also careful to specify that the "useful, concrete and tangible result" it found was "a final share price momentarily fixed for recording purposes and even accepted and relied upon by regulatory authorities and in subsequent trades." (i.e. the trading activity is the further practical use of the real world

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monetary data beyond the transformation in the computer – i.e., "post-processing activity".)

7. Applicant cites no such specific results to define a useful, concrete and tangible result. Neither does Applicant specify the associated practical application with the kind of specificity the Federal Circuit used.

8. Furthermore, in the case *In re Warmerdam*, the Federal Circuit held that:

...[t]he dispositive issue for assessing compliance with Section 101 in this case is whether the claim is for a process that goes beyond simply manipulating 'abstract ideas' or 'natural phenomena' ... As the Supreme Court has made clear, '[a]n idea of itself is not patentable, ... taking several abstract ideas and manipulating them together adds nothing to the basic equation. In re Warmerdam 31 USPQ2d at 1759 (emphasis added).

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9. Since the Federal Circuit held in *Warmerdam* that this is the "dispositive issue" when it judged the usefulness, concreteness, and tangibility of the claim limitations in that case, Examiner in the present case views this holding as the dispositive issue for determining whether a claim is "useful, concrete, and tangible" in similar cases. Accordingly, the Examiner finds that Applicant manipulated a set of abstract "computational nodes" and "processing layers" to solve purely algorithmic problems in the abstract (i.e., what *kind* of "nodes" (and "layers") are used? Generally, neural network nodes are implemented purely in software as nonlinear regression algorithms. It is possible to have hardware artificial neural nodes, but Applicant makes no such limitation in the claims) Clearly, a claim for manipulation of "nodes" (and "layers") is provably even more abstract (and thereby less limited in practical application) than pure "mathematical algorithms" (since they can be applied to solve mathematical algorithms...and more) which the Supreme Court has held are per se nonstatutory – in fact, it *includes* the expression of nonstatutory mathematical nodal and layer algorithms.

10. Since the claims are not limited to exclude such abstractions, the broadest reasonable interpretation of the claim limitations includes such abstractions. Therefore, the claims are impermissibly abstract under 35 U.S.C. §101 doctrine.

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11. Since *Warmerdam* is within the *Alappat-State Street Bank* line of cases, it takes the same view of "useful, concrete, and tangible" the Federal Circuit applied in *State Street Bank*. Therefore, under *State Street Bank*, this could not be a "useful, concrete and tangible result". There is only manipulation of abstract ideas.

12. The Federal Circuit validated the use of *Warmerdam* in its more recent *AT&T Corp. v. Excel Communications, Inc.* decision. The Court reminded us that:

Finally, the decision in *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994) is not to the contrary. *** The court found that the claimed process did nothing more than manipulate basic mathematical constructs and concluded that 'taking several abstract ideas and manipulating them together adds nothing to the basic equation'; hence, the court held that the claims were properly rejected under §101 ... Whether one agrees with the court's conclusion on the facts, the holding of the case is a straightforward application of the basic principle that mere laws of nature, natural phenomena, and abstract ideas are not within the categories of inventions or discoveries that may be patented under §101. (emphasis added) *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447, 1453 (Fed. Cir. 1999).

13. Remember that in *In re Warmerdam*, the Court said that this was the dispositive issue to be considered. In the *AT&T* decision cited above, the Court reaffirms that this is the issue for assessing the "useful, concrete, and tangible" nature of a set of claims under §101 doctrine. Accordingly, Examiner views the *Warmerdam* holding as the dispositive issue in this analogous case.

14. The fact that the invention is merely the manipulation of *abstract ideas* is clear. The data referred to by Applicant's phrases "nodes" (and "layers") are simply abstract constructs that do not limit the claims to the transformation of real world data (such as

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monetary data or heart rhythm data) by some disclosed process. Consequently, the necessary conclusion under *AT&T*, *State Street* and *Warmerdam*, is straightforward and clear. The claims take several abstract ideas (i.e., "nodes" and "layers" in the abstract) and manipulate them together adding nothing to the basic equation. Claims 1-90 are, thereby, rejected under 35 U.S.C. §101.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. §112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-90 are rejected under 35 U.S.C. §112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed *how* to practice the *undisclosed* practical application. This is how the MPEP puts it:

("The how to use prong of section 112 incorporates as a matter of law the requirement of 35 U.S.C. §101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. § 101, then the application also fails as a matter of law to enable one of ordinary skill in the art to use the invention under 35 U.S.C. § 112."); *In re Kirk*, 376 F.2d 936, 942, 153 USPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, otherwise an applicant would anomalously be required to teach how to use a useless invention.") See, MPEP 2107.01(IV), quoting *In re Kirk* (emphasis added).

Therefore, claims 1-90 are rejected on this basis.

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Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-5 and 27-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Lo (U.S. Patent Number 5,408,424; dated 18 April 1995; class 708; subclass 303).
Specifically:

Claim 1

Claim 1's "using a **plurality of layers**, each layer including a plurality of computational nodes, an input processing layer, a central processing layer, and an output processing layer;" is anticipated by Lo, Fig 6 in its entirety.

Claim 1's "using at least one **feedforward** channel for inputs;" is anticipated by Lo, Fig 6 in its interlink nodes.

Claim 1's "using **full lateral and feedback** connections within the processing layers;" is anticipated by Lo, Fig 4.

Claim 1's "using an **output channel** for outputs;" is anticipated by Lo, Fig 6, element 28.

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Claim 1's "using **re-entrant feedback** from the output channel to at least one of the processing layers;" is anticipated by Lo, Fig 6, element 26.

Claim 1's "using **local update** processes to update each of the plurality of computational nodes; and" is anticipated by Lo, col. 2, lines 13-18, where it recites:

Then the EKF uses the KF equations to update the estimated value of $x(t+1)$ and the predicted value of $x(t+2)$ for the new measurement $y(t+1)$. By iterating the linearization and estimation a certain number of times or until convergence at each time point, we have the so-called iterated EKF (IEKF).

Claim 1's "using **re-entrant feedback** from the output channel to perform minimalization for general computation." is anticipated by Lo, Fig 6, element 26.

Claim 2

Claim 2's "The method of claim 1, wherein the output channel uses **feedforward** connections between the output channel and at least one of the processing layers." is anticipated by Lo, Fig 6, element 28.

Claim 3

Claim 3's "The method of claim 1, wherein the output channel uses **bi-directional** connections between the output channel and at least one of the processing layers." is anticipated by Lo, col. 3, lines 31-39, where it recites:

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There is a large number of ANN paradigms such as Hopfield networks, high-order networks, counter-propagation networks, **bidirectional** associative memories, piecewise linear machines, neocognitrons, self-organizing feature maps, adaptive resonance theory networks, Boltzmann machines, multilayer perceptrons (MLPs), MLPs with various feedback structures, other recurrent neural network paradigms, etc. (Emphasis added.)

Claim 4

Claim 4's "The method of claim 1, wherein the re-entrant feedback is **unidirectional**." is anticipated by Lo, Fig. 6, element 26.

Claim 5

Claim 5's "The method of claim 1, wherein the re-entrant feedback is **bidirectional**." is anticipated by Lo, col. 3, lines 31-39, where it recites:

There is a large number of ANN paradigms such as Hopfield networks, high-order networks, counter-propagation networks, **bidirectional** associative memories, piecewise linear machines, neocognitrons, self-organizing feature maps, adaptive resonance theory networks, Boltzmann machines, multilayer perceptrons (MLPs), MLPs with various feedback structures, other recurrent neural network paradigms, etc. (Emphasis added.)

Claim 27

Claim 27's "neural network architecture means having a **plurality of layer means**, each layer means including a plurality of adaptive computational node means, the plurality of layer means" is anticipated by Lo, Fig. 4, elements 15-19.

Claim 27's "input processing layer means, **central** processing layer means, and output processing layer means;" is anticipated by Lo, Fig. 4, elements 15-19.

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Claim 27's **"feedforward input channel means;"** is anticipated by Lo, Fig. 4, elements 16 and 17.

Claim 27's **"full lateral and feedback connection means within the processing layer means;"** is anticipated by Lo, Fig. 4, elements 18.

Claim 27's **"output channel means;"** is anticipated by Lo, Fig. 4, elements 17.

Claim 27's **"re-entrant feedback means from the output channel means to the processing layer means;"** is anticipated by Lo, Fig. 6, element 26.

Claim 27's **"means for updating each of the plurality of adaptive computational node means using local update processes; and"** is anticipated by Lo, col. 2, lines 13-18, where it recites:

Then the EKF uses the KF equations to **update** the estimated value of $x(t+1)$ and the predicted value of $x(t+2)$ for the new measurement $y(t+1)$. By iterating the linearization and estimation a certain number of times or until convergence at each time point, we have the so-called iterated EKF (IEKF).

Claim 27's **"means for using re-entrant feedback from the output channel means to perform minimalization for general computation."** is anticipated by Lo, Fig 6, element 26.

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Claim 28

Claim 28's "The apparatus of claim 27, wherein the output channel means uses **feedforward** connection means between the output channel means and the processing layer means." is anticipated by Lo, Fig 6, element 28.

Claim 29

Claim 29's "The apparatus of claim 27, wherein the output channel means uses **bi-directional** connection means between the output channel means and the processing layer means." is anticipated by Lo, col. 3, lines 31-39, where it recites:

There is a large number of ANN paradigms such as Hopfield networks, high-order networks, counter-propagation networks, **bidirectional** associative memories, piecewise linear machines, neocognitrons, self-organizing feature maps, adaptive resonance theory networks, Boltzmann machines, multilayer perceptrons (MLPs), MLPs with various feedback structures, other recurrent neural network paradigms, etc. (Emphasis added.)

Claim 30

Claim 30's "The apparatus of claim 27, wherein the re-entrant feedback means is **uni-directional**." is anticipated by Lo, Fig 6, element 26.

Claim 31

Claim 31's "The apparatus of claim 27, wherein the re-entrant feedback means is **bi-directional**." is anticipated by Lo, col. 3, lines 31-39, where it recites:

There is a large number of ANN paradigms such as Hopfield networks, high-order networks, counter-propagation networks, **bidirectional** associative

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memories, piecewise linear machines, neocognitrons, self-organizing feature maps, adaptive resonance theory networks, Boltzmann machines, multilayer perceptrons (MLPs), MLPs with various feedback structures, other recurrent neural network paradigms, etc. (Emphasis added.)

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Specifically:

- A. Pechanek, et al. (U.S. Patent Number 5,517,596; dated 14 May 1996; class 706; subclass 025) discloses a learning machine synapse processor system apparatus.
- B. Tawel (U.S. Patent Number 5,299,285; dated 29 March 1994; class 706; subclass 025) discloses a neural network with dynamically adaptable neurons.
- C. Castro (U.S. Patent Number 5,237,210; dated 17 August 1993; class 706; subclass 035) discloses a neural network accommodating parallel synaptic weight adjustments for correlation learning algorithms.
- D. Eberhardt (U.S. Patent Number 5,056,037; dated 08 October 1991; class 706; subclass 039) discloses analog hardware for learning neural networks.

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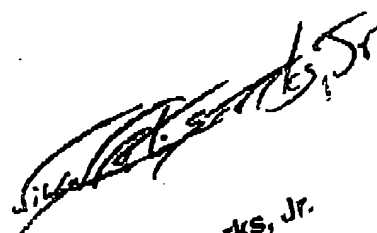
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Wilbert L. Starks, Jr. whose telephone number is (703) 305-0027. *272-3691* (571)

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23 September 2004



Wilbert L. Starks, Jr.
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